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### **AMENDMENTS**

Kindly amend the subject application as follows:

# **IN THE CLAIMS**:

Please amend the claims as follows:

1. (Currently Amended) A compound according to Formula I:

$$\begin{array}{c|c}
R_2 \\
X_1 \\
X_3 \\
R_1
\end{array}$$

$$\begin{array}{c|c}
R_3 \\
R_3
\end{array}$$

$$\begin{array}{c|c}
R_3 \\
R_1
\end{array}$$

wherein:

X<sub>1</sub> is O;

X<sub>2</sub> is CH;

X<sub>3</sub> is NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>4</sub> is N;

 $X_1$  and  $X_3$  are each independently-selected from the group consisting of O, S and NR<sub>8</sub>, wherein R<sub>8</sub> is H or alkyl;

X2 and X4 are each independently CH or N;

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and 
$$N \longrightarrow R_7 \\ R_8 \\ \vdots \\ R_8$$

 $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

R<sub>7</sub> and R<sub>8</sub> are each independently selected from the group consisting of H and alkyl.

2. (Currently Amended) The compound according to Claim 1, wherein:

X<sub>1</sub>-is-O;

X2 is C;

X<sub>3</sub> is NH

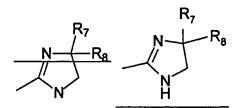
X<sub>4</sub> is N and

R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are each H.

3. (Withdrawn) The compound according to Claim 1, wherein A is

and R<sub>6</sub> is alkyl.

4. (Currently Amended) The compound according to Claim 1, wherein A is



and R<sub>7</sub> and R<sub>8</sub> are each H.

- 5. (Original) The compound according to Claim 1, wherein  $R_1$  is an amino group.
- 6. (Original) The compound according to Claim 1, wherein  $R_1$  is a nitro group.
- 7. (Currently Amended) The compound according to Claim 1, wherein the compound is represented by the formula:

8. (Withdrawn) The compound according to Claim 1, wherein the compound is represented by the formula:

9. (Withdrawn) The compound according to Claim 1, wherein the compound is represented by the formula:

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10. (Withdrawn) The compound according to Claim 1, wherein the compound is represented by the formula:

- 11. (Original) A pharmaceutical composition comprising a compound of Claim 1, in a pharmaceutically acceptable carrier.
- 12. (Original) The pharmaceutical composition according to Claim 11, wherein the composition is formulated for intravenous administration.
- 13. (Original) The pharmaceutical composition according to Claim 11, wherein the composition is formulated for oral administration.

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14. (Currently Amended)

A compound according to Formula II:

wherein:

 $X_1$  is O;

X<sub>2</sub> is CH;

X<sub>3</sub> is NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>4</sub> is N;

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X2-and-X4-are each independently CH or N;

$$\begin{array}{c|c} R_7 & R_7 \\ \hline N & R_8 \\ \hline N & H \end{array}$$

and 
$$N \longrightarrow R_7$$

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 $R_1$ ,  $R_2$ , and  $R_3$ ,  $R_4$ -and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

R<sub>7</sub> and R<sub>8</sub> are each independently selected from the group consisting of H and alkyl.

- 15. (Original) A pharmaceutical composition comprising a compound of Claim 14, in a pharmaceutically acceptable carrier.
- 16. (Original) The pharmaceutical composition according to Claim 15, wherein the composition is formulated for intravenous administration.
- 17. (Original) The pharmaceutical composition according to Claim 15, wherein the composition is formulated for oral administration.
  - 18. (Currently Amended) A compound according to Formula III:

wherein:

X<sub>1</sub> is O;

X<sub>2</sub> is CH;

X<sub>3</sub> is NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>4</sub> is N;

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X<sub>1</sub>-and X<sub>3</sub>-are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X2 and X4 are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

 $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  and  $R_6$  are each independently selected from the group consisting of H, alkyl, alkoxy, halo, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $\ensuremath{\mathsf{R}}_7$  and  $\ensuremath{\mathsf{R}}_8$  are each independently selected from the group consisting of H and alkyl.

- 19. (Original) A pharmaceutical composition comprising a compound of Claim 18, in a pharmaceutically acceptable carrier.
- 20. (Original) The pharmaceutical composition according to Claim 19, wherein the composition is formulated for intravenous administration.
- 21. (Original) The pharmaceutical composition according to Claim 19, wherein the composition is formulated for oral administration.
  - 22. (Currently Amended) A compound according to Formula IV:

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$$R_1$$
 $X_2$ 
 $X_3$ 
 $X_4$ 
 $X_3$ 
 $X_4$ 
 $X_3$ 
 $X_4$ 
 $X_3$ 

wherein:

X<sub>1</sub> is O;

X<sub>2</sub> is CH;

X<sub>3</sub> is NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>4</sub> is N;

 $X_4$ -and  $X_3$ -are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

and 
$$N \longrightarrow R_8$$

 $R_1$ ,  $R_2$ , and  $R_3$ ,  $R_4$  and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $\ensuremath{\mathsf{R}}_7$  and  $\ensuremath{\mathsf{R}}_8$  are each independently selected from the group consisting of H and alkyl.

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- 23. (Original) A pharmaceutical composition comprising a compound of Claim 22, in a pharmaceutically acceptable carrier.
- 24. (Original) The pharmaceutical composition according to Claim 23, wherein the composition is formulated for intravenous administration.
- 25. (Original) The pharmaceutical composition according to Claim 23, wherein the composition is formulated for oral administration.

## 26-52. (Canceled)

53. (Withdrawn) A method of treating bovine viral diarrhea virus (BVDV) infection in a subject in need of such treatment, comprising administering to the subject a compound selected from the group consisting of Formula I and Formula II:

#### wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

 $X_2$  and  $X_4$  are each independently CH or N;

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

R<sub>7</sub> and R<sub>8</sub> are each independently selected from the group consisting of H and alkyl;

or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the bovine viral diarrhea virus (BVDV) infection.

- 54. (Withdrawn) The method according to Claim 53, wherein the compound is a compound of Formula I.
- 55. (Withdrawn) The method according to Claim 53, wherein the compound is represented by the formula:

- 56. (Withdrawn) The method according to Claim 53, wherein the subject is a cow.
- 57. (Withdrawn) The method according to Claim 53, wherein the subject is an embryo.

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- 58. (Withdrawn) The method according to Claim 53, wherein the compound is administered intravenously.
- 59. (Withdrawn) The method according to Claim 53, wherein the compound is administered orally.
- 60. (Withdrawn) A method of treating bovine viral diarrhea virus (BVDV) infection in a subject in need of such treatment, comprising administering to the subject a compound selected from the group consisting of Formula III and Formula IV:

$$R_4$$
 $X_2$ 
 $X_4$ 
 $X_3$ 
 $X_4$ 
 $X_5$ 
 $X_4$ 
 $X_5$ 
 $X_4$ 
 $X_5$ 
 $X_4$ 
 $X_5$ 
 $X_5$ 

wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

 $X_2$  and  $X_4$  are each independently CH or N;

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R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl;

or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the bovine viral diarrhea virus (BVDV) infection.

### 61-77. (Canceled)

78. (Withdrawn) A method of treating hepatitis C infection in a subject in need of such treatment, comprising administering to the subject a compound selected from the group consisting of Formula I and Formula II:

wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

 $X_2$  and  $X_4$  are each independently CH or N;

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$$NH$$
 $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_8$ 

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl;

or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the hepatitis C infection.

- 79. (Withdrawn) The method according to Claim 78, wherein the compound is a compound of Formula I.
- 80. (Withdrawn) The method according to Claim 78, wherein the compound is represented by the formula:

- 81. (Withdrawn) The method according to Claim 78, wherein the subject is a human.
- 82. (Withdrawn) The method according to Claim 78, wherein the compound is administered intravenously.

- 83. (Withdrawn) The method according to Claim 78, wherein the compound is administered orally.
- 84. (Withdrawn) A method of treating hepatitis C infection in a subject in need of such treatment, comprising administering to the subject a compound selected from the group consisting of Formula III and Formula IV:

œ,

$$\begin{array}{c|cccc}
R_1 & X_2 & (III) \\
\hline
R_1 & X_3 & X_4 & R_3 \\
\hline
R_1 & X_2 & (IV) & X_4 & R_3 \\
\hline
R_1 & X_2 & (IV) & X_4 & R_3 \\
\hline
R_1 & X_2 & (IV) & X_4 & R_3 \\
\hline
R_1 & X_2 & (IV) & X_4 & R_3 \\
\hline
R_2 & X_3 & X_4 & R_3 & R_3 \\
\hline
R_3 & X_4 & X_5 & R_3 & R_3 \\
\hline
R_1 & X_2 & (IV) & X_4 & R_3 \\
\hline
R_2 & X_3 & X_4 & R_3 & R_3 \\
\hline
R_3 & X_4 & X_5 & R_3 & R_3 \\
\hline
R_4 & X_5 & X_5 & R_5 & R_5 \\
\hline
R_5 & X_6 & X_7 & R_7 & R_7 & R_7 \\
\hline
R_7 & X_8 & X_9 & R_7 & R_7 & R_7 & R_7 \\
\hline
R_8 & X_9 & X_9 & R_7 & R_7 & R_7 & R_7 \\
\hline
R_9 & X_1 & X_2 & R_7 & R_7 & R_7 & R_7 & R_7 & R_7 \\
\hline
R_1 & X_2 & X_3 & X_4 & R_7 & R_$$

wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

$$NH$$
 $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_8$ 

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 $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl;

or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the hepatitis C infection.

85-100. (Canceled)

101. (Withdrawn) A method of treating a member of the *Flaviviridae* family of viruses in a subject in need of such treatment, comprising administering to the subject a compound selected from the group consisting of Formula I and Formula II:

wherein

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

$$NH$$
 $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_8$ 

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 $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, halide, alkylhalide, amidine, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl;

or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the bovine viral diarrhea virus (BVDV) infection.

- 102. (Withdrawn) The method according to Claim 101, wherein the compound is a compound of Formula II.
- 103. (Withdrawn) The method according to Claim 101, wherein the compound is represented by the formula:

104. (Withdrawn) The method according to Claim 101, wherein the compound is represented by the formula:

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105. (Withdrawn) The method according to Claim 101, wherein the compound is administered intravenously.

106. (Withdrawn) The method according to Claim 101, wherein the compound is administered orally.

107. (Withdrawn) A method of treating a culture for bovine viral diarrhea virus (BVDV) infection, comprising administering to the culture a compound selected from the group consisting of Formula (I)-Formula (IV):

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### wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

$$NH$$
 $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_8$ 

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of H, alkyl, alkoxy, amidine, halide, alkylhalide, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl; or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the BVDV infection.

108. (Withdrawn) The method of Claim 107, wherein the culture is selected from one of a cell culture and a tissue culture.

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109. (Withdrawn) A method of treating an embryo for bovine viral diarrhea virus (BVDV) infection, comprising administering to the embryo a compound selected from the group consisting of Formula (I)-Formula (IV):

wherein:

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 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

$$NH$$
 $NHR_6$ 
 $NHR_6$ 

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub>-are each independently selected from the group consisting of H, alkyl, alkoxy, amidine, halide, alkylhalide, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

R<sub>7</sub> and R<sub>8</sub> are each independently selected from the group consisting of H and alkyl; or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the BVDV infection.

- 110. (Withdrawn) The method of Claim 109, wherein the embryo comprises an *in vitro*-produced embryo.
- 111. (Withdrawn) A method of treating bovine viral diarrhea virus (BVDV) in a culture medium surrounding an *in vitro*-produced embryo, comprising administering to the culture medium a compound selected from the group consisting of Formula (I)-Formula (IV):

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wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X2 and X4 are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

$$NH$$
 $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_6$ ,  $NHR_8$ 

 $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are each independently selected from the group consisting of H, alkyl, alkoxy, amidine, halide, alkylhalide, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

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 $R_7$  and  $R_8$  are each independently selected from the group consisting of H and alkyl; or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the BVDV.

- 112. (Withdrawn) A method of preparing a biological specimen or medium for use in an *in vitro* fertilization procedure, the method comprising:
  - (a) providing the biological specimen or medium; and
- (b) administering to the biological specimen or medium a compound selected from the group consisting of Formula (IV):

$$\begin{array}{c} R_{1} \\ X_{1} \\ X_{3} \\ X_{3} \\ X_{4} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{7} \\ X_{7} \\ X_{7} \\ X_{8} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{7} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{7} \\ X_{8} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{5} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{5} \\ X_{6} \\ X_{7} \\ X_{7} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{8} \\ X_{1} \\ X_{2} \\ X_{3} \\ X_{4} \\ X_{5} \\ X_{5} \\ X_{7} \\ X_{8} \\$$

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wherein:

 $X_1$  and  $X_3$  are each independently selected from the group consisting of O, S and NR<sub>9</sub>, wherein R<sub>9</sub> is H or alkyl;

X<sub>2</sub> and X<sub>4</sub> are each independently CH or N;

A is selected from the group consisting of H, alkyl, aryl,

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of H, alkyl, alkoxy, amidine, halide, alkylhalide, nitro and amino groups;

R<sub>6</sub> is H, alkyl or aryl; and

R<sub>7</sub> and R<sub>8</sub> are each independently selected from the group consisting of H and alkyl; or a pharmaceutically acceptable salt thereof, in an amount sufficient to treat the biological specimen or medium for a BVDV infection.

113. (Withdrawn) The method of Claim 112, wherein the biological specimen or medium comprises a gamete, a serum, a somatic cell, an oocyte, a cumulus oocyte complex (COC), an embryo, a culture medium surrounding an embryo, and combinations thereof.